

## CLAIMS

What is claimed is:

- 1           1.     A transmitter for use in a communication system  
2     comprising:  
3                 a signal folder for rearranging a signal wherein a plurality  
4                 of complex time samples are modulated on an in-phase carrier;  
5                 and  
6                 an envelope shaper for shaping the envelope of the signal.
- 1           2.     A receiver for use in a communication system comprising:  
2                 a signal unfolder for reconstructing a signal comprising a  
3                 plurality of complex time samples modulated on an in-phase  
4                 carrier.
- 1           3.     A communication system comprising:  
2                 a transmitter wherein a first signal is rearranged such that  
3                 a plurality of complex time samples are modulated on an in-  
4                 phase carrier and an envelope of the signal is shaped to create a  
5                 second signal; and  
6                 a receiver in communication with the transmitter through a  
7                 noisy channel for receiving said second signal comprising a  
8                 plurality of complex time samples modulated on an in-phase  
9                 carrier, wherein the receiver reconstructs said first signal from  
10                the envelope shaped second signal.
- 1           4.     A method for shaping an envelope a complex signal,  
2                 composed of a plurality of sample symbols with a real part and  
3                 imaginary part, by keeping the amplitude of each of said sample  
4                 symbols at or below a threshold value, said method comprising  
5                 the steps of:  
6                 rearranging a first signal in time domain;

7 obtaining the amplitude of one of said sample symbols of  
8 said first signal;

9 comparing the amplitude of said one of said sample  
10 symbols to said threshold value;

11 the amplitude and sign of real part of each of a second set  
12 of a plurality of sample symbols to the amplitude and sign of the  
13 real part of said one of said sample symbols, if the amplitude of  
14 the real part of said one of said sample symbol is equal to or less  
15 than said threshold value;

16 setting the imaginary part of each of a second set of a  
17 plurality of sample symbols to the amplitude value equal to said  
18 threshold value minus the amplitude of the real part said one  
19 said sample symbols and wherein the sign of the imaginary part  
20 of each of a second set of a plurality of sample symbols is the  
21 sign of the real part of said one of said sample values, if the  
22 amplitude of the real part of said one of said sample symbol is  
23 equal to of less than said threshold value;

24 setting the sign of the real part of each of a second set of a  
25 plurality of sample symbols to positive and the amplitude of real  
26 part of each of a second set of a plurality of sample symbols to  
27 half the amplitude of the real part of said one of said sample  
28 symbols, if the amplitude of the real part of said one of said  
29 sample symbol is greater than said threshold value; and

30 setting the sign of the imaginary part of each of a second  
31 set of a plurality of sample symbols to negative and the  
32 amplitude value of the imaginary part of each of a second set of  
33 a plurality of sample symbols equal to one half the amplitude of  
34 the real part said one said sample symbols, if the amplitude of  
35 the real part of said one of said sample symbol is greater than  
36 said threshold value.

1           5. The method of claim 4 wherein the steps of the method are  
2 repeated for each of said plurality of sample symbols.

1           6. A method for shaping an envelope a complex signal,  
2 composed of a plurality of sample symbols with a real part and  
3 imaginary part, by keeping the amplitude of each of said sample  
4 symbols at or below a threshold value, said method comprising the  
5 steps of:

6                   rearranging a first signal in time domain;

7                   obtaining the amplitude of one of said sample symbols of  
8 said first signal;

9                   comparing the amplitude of said one of said sample  
10 symbols to said threshold value;

11                   the amplitude and sign of real part of each of a second set  
12 of a plurality of sample symbols to the amplitude and sign of the  
13 real part of said one of said sample symbols, if the amplitude of  
14 the real part of said one of said sample symbol is equal to or less  
15 than said threshold value;

16                   setting the amplitude of the imaginary part of each of a  
17 second set of a plurality of sample symbols to the square root of  
18 (the square of said threshold value minus the square of the  
19 amplitude of the real part of said one of said sample symbols)  
20 and wherein the sign of the imaginary part of each of a second  
21 set of a plurality of sample symbols is the sign of the real part of  
22 said one of said sample values, if the amplitude of the real part  
23 of said one of said sample symbol is equal to of less than said  
24 threshold value;

25                   setting the sign of the real part of each of a second set of a  
26 plurality of sample symbols to positive and the amplitude of real  
27 part of each of a second set of a plurality of sample symbols to

28 half the amplitude and of amplitude of the real part of said one of  
29 said sample symbols, if the amplitude of the real part said one of  
30 said sample symbol is greater than said threshold value; and

31 setting the sign of the imaginary part of each of a second  
32 set of a plurality of sample symbols to negative and the  
33 amplitude value of the imaginary part of each of a second set of  
34 a plurality of sample symbols equal to one half the amplitude of  
35 the real part said one said sample symbols, if the amplitude of  
36 the real part said one of said sample symbol is greater than said  
37 threshold value.

1 7. The method of claim 6 wherein the steps of the method are  
2 repeated for each of said plurality of sample symbols.